Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Introduction

Climate change poses a significant challenge for the Mediterranean region, affecting both environmental and anthropogenic systems and their interaction.

According to the fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC 2007a) the physical effects of climate change include rising temperature and declining precipitation, exacerbating existing pressures on limited water resources. Population pressure and water-intensive activities such as irrigation already impose stress on water supplies, posing dangers to human health, ecosystems and national economies of countries.

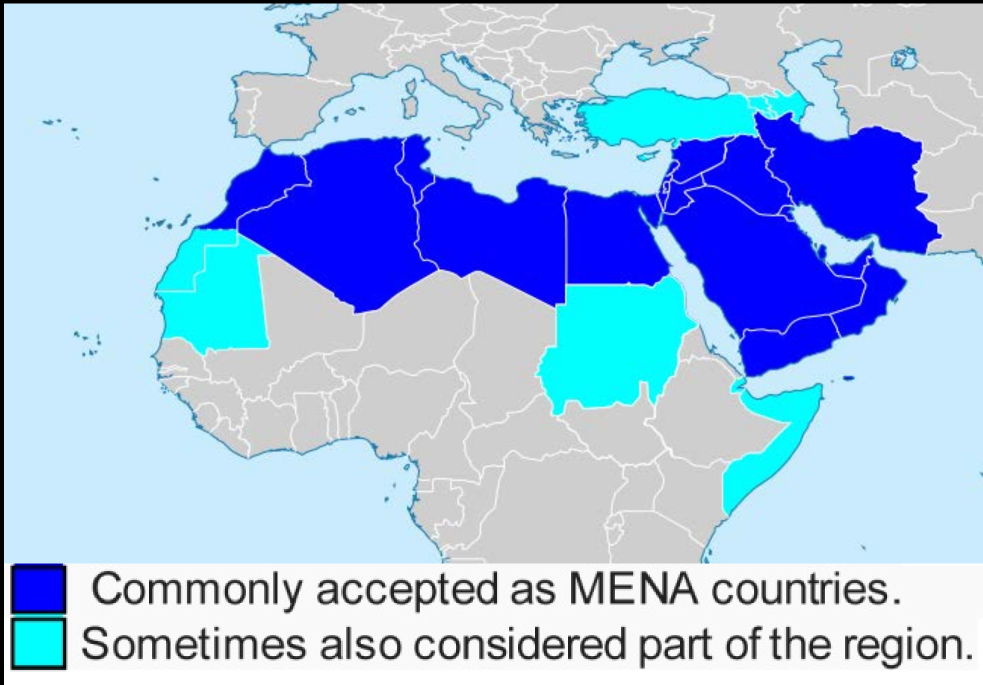
Projected sea-level rise affects densely populated coastal regions.

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Introduction

Particular severe impacts are projected for the Middle East and North Africa (MENA), where the combination of climate change with environmental degradation, water scarcity, food insecurity, population growth, economic, and societal instability could contribute to security risks and conflicts in the region.



Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Projections and Impacts of Future Climate Change in the Mediterranean

Temperature Change

According to model calculations based on the A1B scenario, a temperature rise of 2.2–5.1 °C (mean 3.4 °C) in the Mediterranean area is likely by 2100 compared to the baseline period of 1980–1999 (IPCC 2007a).

The IPCC (2007a) synthesis report concluded that "in southern Europe, climate change is projected to worsen conditions (high temperatures and drought) in a region already vulnerable to climate variability".

Projections and model consistency of relative changes in runoff by the end of the 21st century

(from IPCC 2007a)

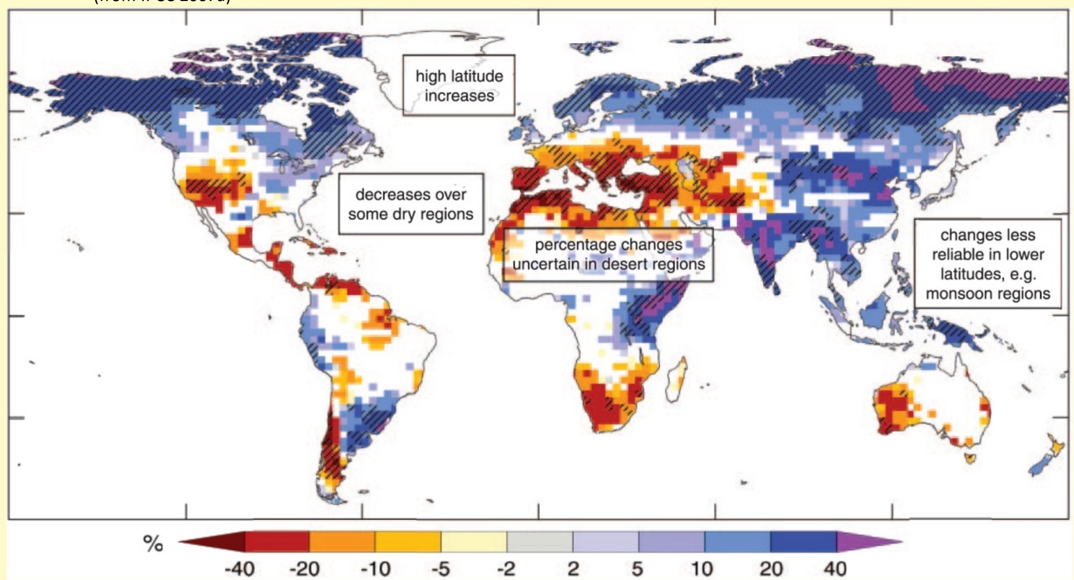


Figure 3.5. *Large-scale relative changes in annual runoff (water availability, in percent) for the period 2090-2099, relative to 1980-1999. Values represent the median of 12 climate models using the SRES A1B scenario. White areas are where less than 66% of the 12 models agree on the sign of change and hatched areas are where more than 90% of models agree on the sign of change. The quality of the simulation of the observed large-scale 20th century runoff is used as a basis for selecting the 12 models from the multi-model ensemble. The global map of annual runoff illustrates a large scale and is not intended to refer to smaller temporal and spatial scales. In areas where rainfall and runoff is very low (e.g. desert areas), small changes in runoff can lead to large percentage changes. In some regions, the sign of projected changes in runoff differs from recently observed trends. In some areas with projected increases in runoff, different seasonal effects are expected, such as increased wet season runoff and decreased dry season runoff. Studies using results from few climate models can be considerably different from the results presented here. {WGII Figure 3.4, adjusted to match the assumptions of Figure SYR 3.3; WGII 3.3.1, 3.4.1, 3.5.1}*

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Projections and Impacts of Future Climate Change in the Mediterranean

Temperature Change

Based on IPCC (2007a) findings Abou and Ayman (2009) noted that by the end of the twenty-first century, the Arab region will face projected decrease in precipitation up to 20 %.

These changes will lead to shorter winters and dryer summers, hotter summers, more frequent heat wave occurrence, and more variability and extreme weather events occurrence.

By the end of the twenty-first century, the Arab region will face projected decrease in precipitation up to 20 % (Abou and Ayman 2009)

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Projections and Impacts of Future Climate Change in the Mediterranean

<u>Changes in Precipitation</u>

For the future the greatest decline in precipitation is anticipated **<u>in summer</u>**.

According to the scenarios of the Acacia project <u>in summer</u> the precipitation will decline:

in South Europe
- until 2020, in Spain by ≈ 14 %, in Greece by ≈ 10 %;
- until 2050, in Spain by ≈ 22 %, in Greece by ≈ 17 %;
- untill 2080, in Spain by ≈ <u>35 %</u>, in Greece by ≈ <u>23 %</u>.

in North Africa
- until 2020, by ≈ 23%,
- until 2050, by ≈ 40%
- until 2080, by ≈ <u>61%</u>.

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Projections and Impacts of Future Climate Change in the Mediterranean

Extreme Weather Events and Hazards

In Europe and North Africa average precipitation reduction is associated with a reduced number of precipitation days (Räisänen et al. 2004).

For the future a significant prolongation of very long dry spells is expected by end of the century (Voss et al. 2002) and considerable drying over western Mediterranean and North Africa (Beniston et al. 2007).

In Northern Africa, the risk of extreme events, in particular droughts, is likely to increase (Schilling et al. 2012).

Droughts in Northern Africa

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Projections and Impacts of Future Climate Change in the Mediterranean

<u>Projected Sea-Level Rise</u>

The projections on the average sea-level rise have been disputed in the preparation of the IPCC's AR4 which could only agree on an average increase during the twenty-first century of <u>18–59 cm</u>.

Towards the end of the twenty-first century, <u>projected sea level rise will affect low-lying coastal areas with large populations</u>.

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Projections and Impacts of Future Climate Change in the Mediterranean

<u>Projected Sea-Level Rise</u>

The projections on the average sea-level rise have been disputed in the preparation of the IPCC's AR4 which could only agree on an average increase during the twenty-first century of <u>18–59 cm</u>.

Towards the end of the twenty-first century, <u>projected sea level rise will affect low-lying coastal areas with large populations</u>.

Residenti in comuni tra 0 e 1 m sul livello del mare, in Italia:
Veneto: 39876
Emilia Romagna: 45679
Puglia: 18030
Sicilia: 31646
Lazio: 78395
TOTALE: 213626

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Impact of Climate Change on Water Supply and Water-Related Conflicts

Water Scarcity and Conflicts in the Mediterranean

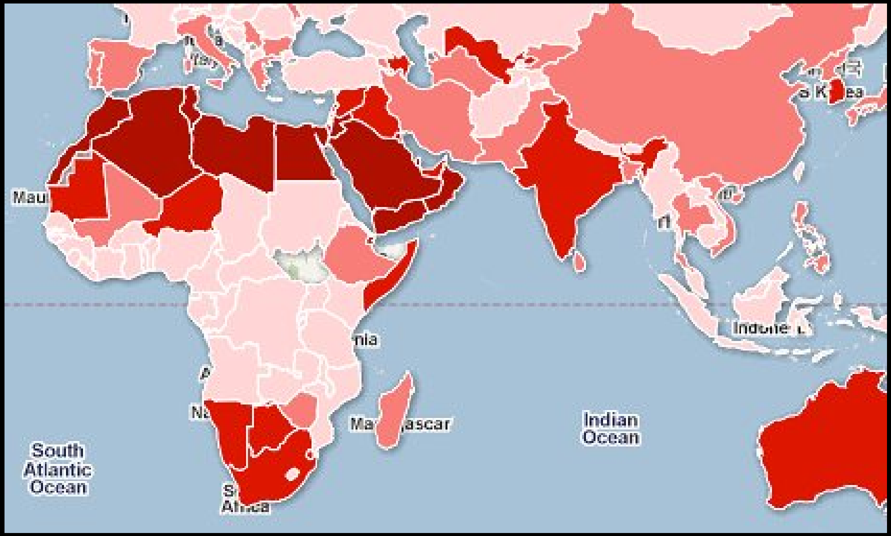
The North African countries are either termed water stressed or water scarce, with Algeria and Tunisia facing the highest level of water scarcity while in Egypt and Morocco water is less scarce (Schilling et al. 2012).

Water is the resource most directly and strongly negatively affected by climatic change, and the MENA region is already one of the regions with high water scarcity and severe droughts.

Higher temperatures and less precipitations will likely decrease overall water availability.

Increasing water scarcity has negative impact on agricultural and forestry yields and on hydropower.

Increased risk of fires in droughts will compromise vegetation cover (from forest to bush and patchy cover).



From: The Guardian, 2011, Middle East: Water scarcity in Africa and the Middle East: get the data. https://www.theguardian.com/. Accessed 01/11/2016

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Impact of Climate Change on Water Supply and Water-Related Conflicts

Water Scarcity and Conflicts in the Mediterranean

The North African countries are either termed water stressed or water scarce, with Algeria and Tunisia facing the highest level of water scarcity while in Egypt and Morocco water is less scarce (Schilling et al. 2012).

Water is the resource most directly and strongly negatively affected by climatic change, and the MENA region is already one of the regions with high water scarcity and severe droughts.

Higher temperatures and less precipitations will likely decrease overall water availability.

Increasing water scarcity has negative impact on agricultural and forestry yields and on hydropower.

Increased risk of fires in droughts will compromise vegetation cover (from forest to bush and patchy cover).

Prolonged drought has dried up the Yermasoyia reservoir in southern Cyprus, 2 July 2008 (Eatglobe, 2016, Middle East: Worst Drought in 900 Years. http://www.eatglobe.com. Accessed 18/09/2016)

Corn plants withered in a drought-affected field (The Wall Street Journal, 2015, Severe Droughts Leave Africans Hungry and Desperate. http://www.wsj.com. Accessed 18/09/2016)

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Impact of Climate Change on Water Supply and Water-Related Conflicts

Water Scarcity and Conflicts in the Mediterranean

Water has traditionally been a strategic issue in the Middle East, closely interconnected with the region's deeply rooted conflicts.

Since much of the water resources are trans-boundary, water disputes often coincide with land disputes. Competition over utilizing shared resources has been observed for the rivers Nile, Euphrates, Tigris and Jordan.

Most intense conflicts occurred among the co-riparians of the Jordan River basin (Dombrowsky 2003; Selby 2009; Salem 2011).

The Jordan River runs along the border between the Kingdom of Jordan, Israel and Palestine

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Impact of Climate Change on Water Supply and Water-Related Conflicts

Water Scarcity and Conflicts in the Mediterranean

Conflicts are largely determined by deep political differences (in particular, between Israel and the Palestinians), where hydrological matters represent an additional dimension that contributes to social instability, ethnic clashes or border disputes (Messerschmidt 2012).

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Impact of Climate Change on Water Supply and Water-Related Conflicts

Water Scarcity and Conflicts in the Mediterranean

Water shortages in summer are already widespread in many countries of southern Europe and North Africa.

With higher temperatures the evaporation rate of water in the soil will increase, adding to the water problems in summer, when demand for water is greatest.

In Southern Europe, a temperature rise of 2 °C could decrease summer water availability by 20–30 %; a rise of 4 °C by 40–50 % (Stern et al. 2006).

Decreasing water availability has multiple effects, including negative impacts on agricultural and forestry yields and on the generation of hydroelectricity (IPCC 2007b).

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Impact of Climate Change on Water Supply and Water-Related Conflicts

<u>Water Scarcity and Conflicts in the Mediterranean</u>

Due to <u>projected population growth</u> and <u>precipitation decline</u>, the access to <u>safe drinking water</u> and to <u>green water for agriculture</u> will further worsen.

“This dynamic”, the WBGU (2008) argues “triggers <u>distributional conflicts</u> and poses <u>major challenges to water management systems</u> in the countries concerned”. In the MENA region “<u>the countries which will suffer the greatest water stress are generally those which already lack the political and institutional framework necessary for the adaptation of water and crisis management systems</u>. This could overstretch existing conflict resolution mechanisms, <u>ultimately leading to destabilization and violence</u>”.

The world’s population is increasing and water resources are decreasing. By 2025 the world’s population will grow by a further 2.6 billion, and water demand will exceed availability by 56 percent. Two-thirds of the world’s population will live in an area of acute water scarcity (IRIN, 2006, Water Is Running Out: How Inevitable Are International Conflicts? http://www.irinnews.org/. Accessed 18/09/2016)

The world is running out of water”. Many countries have been declared to be in a state of water-stress or water-scarcity, and some experts believe that in the future wars will be fought over water not oil (IRIN, 2006, Water Is Running Out: How Inevitable Are International Conflicts? http://www.irinnews.org/. Accessed 18/09/2016)

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

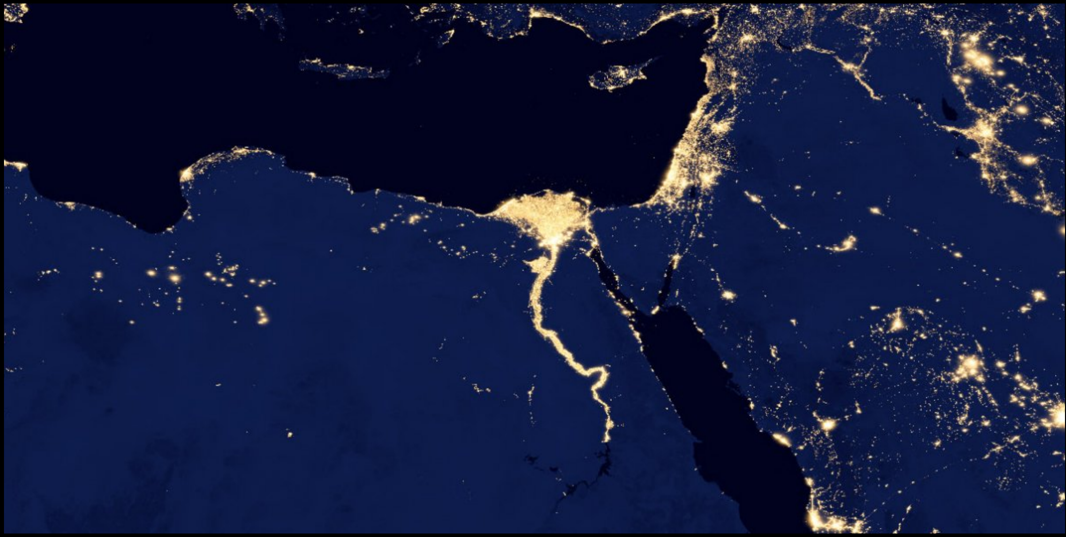
[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Impact of Climate Change on Water Supply and Water-Related Conflicts

The Case of the Nile River Basin

With nearly 6,700 km the Nile is the world's longest river and flows through ten countries, feeding its water into the Eastern Mediterranean Sea.

More than one fifth of the African population lives within the river basin.



Egypt and the Nile at night (NASA, 2012, NASA-NOAA Satellite Reveals New Views of Earth at Night. https://www.nasa.gov. Accessed 19/09/2016)

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Impact of Climate Change on Water Supply and Water-Related Conflicts

The Case of the Nile River Basin

The growing population in the riparian countries increases the pressure on the Nile River water resources.

Water supply into the Blue and White Nile shows large fluctuations which poses a problem for the production of hydroelectric power.

The future development of the overall water supply in the Nile River basin is highly uncertain, and its water resources are sensitive to changes in climatic conditions (Beyene et al. 2010; Conway et al. 2007).

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Impact of Climate Change on Water Supply and Water-Related Conflicts

<u>The Case of the Nile River Basin</u>

<u>Reduced water supply bear a conflict potential</u> among the countries in the Nile basin which have great discrepancies in economic power, individual welfare and societal stability (Piontek 2010; Link et al. 2012).

While the <u>water supply is greatest in the upstream countries</u> which mainly consist of <u>grassland</u>, especially in Ethiopia, the <u>demand for water is largest in the downstream countries</u> Egypt and Sudan where most of the arable land is in the direct vicinity of the river.

Heavily grazed grassland in the highlands near Bule, Ethiopia (FAO, 2005, The changing face of pastoral systems in grass dominated ecosystems of eastern Africa. www.fao.org. Accessed 19/09/2016)

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Impact of Climate Change on Water Supply and Water-Related Conflicts

<u>The Case of the Nile River Basin</u>

Egypt depends on the Nile for <u>95 % of its drinking and industrial water</u> and thus is particularly vulnerable to the impacts of climate change.

Since many of the <u>upstream countries</u> are among the countries most <u>sensitive to hunger</u>, they have <u>growing needs for water</u> to overcome this situation.

<u>If Egypt feels threatened</u> by increasing water demands of upstream countries, it could be tempted to use its hegemonic power, aggravating the chances for <u>political crisis</u> and <u>violent clashes</u> (Piontek 2010; Link et al. 2012).

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Impact of Climate Change on Water Supply and Water-Related Conflicts

The Case of the Nile River Basin

Due to temperature rise, the agriculturally productive Nile river delta is at risk from sea-level rise and salinization, which may affect between two and four million Egyptians (FoEME 2007) many of whom could seek refuge in Cairo's suburbs.

In the Nile delta, "an increase of 50 cm would imply that the salty water would intrude about 9 km into coastal aquifers" (Sherif and Singh 1999; WBGU 2006).

A sea-level rise of 50 cm would affect in the administrative districts of Alexandria and Port Said about "1.5 million people" (ElRaey 1991, 2011; Brauch 2002a).

Alexandria, Egypt

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Consequences for Food Security

Even without climate change the food situation is already critical in the Mediterranean region.

A major problem is salinization which may result from drought and an increase in irrigation. Self-reinforcing consequences are lower air humidity and less precipitation.

If this trend continues it can lead to desertification, with land then being lost for agricultural use.

These developments are a growing problem in parts of Southern Europe, for instance, soils in large areas of Spain and some regions of Italy and Greece are already salinized.

Particularly vulnerable are countries with a intensive agriculture, such as Greece where 7–8 % of GDP depend on agriculture.

From: NIBIO, 2016, European Soil Threats: What, Where and Why?. http://www.nibio.no/. Accessed 03/11/2016

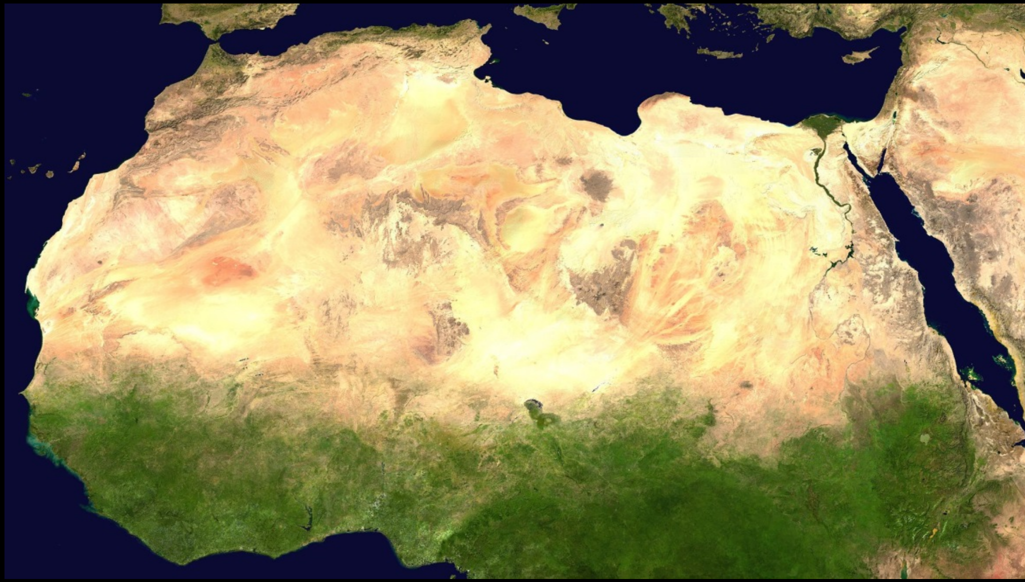
Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Consequences for Food Security

<ins>The situation is much more critical in North Africa</ins>: <ins>the agricultural land is limited by the Sahara</ins>, in Egypt to 2.6 %, in Libya to 1.2 %, in Tunisia to 10.0 %, in Algeria to 3.0 % and in Morocco to 20.0 % of land area (Galil 2011). <ins>The areas suitable for agriculture are already largely exploited</ins>.

Except from Egypt's agricultural sector which depends on the Nile, all other countries in North Africa <ins>rely almost entirely on precipitation for agriculture </ins>(Schilling et al. 2012).



A satellite image of the Sahara

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Consequences for Food Security

The importance of the agricultural sector for the economy varies strongly among the considered states. A large population is directly employed in agriculture, reaching more than 30 % in Egypt (in 2001) and more than 40 % in Morocco (in 2006) (CIA 2010).

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Consequences for Food Security

Since agricultural productivity is very sensitive to changes in temperature and precipitation, for a global temperature rise of 2–4 °C a drop in agricultural productivity is expected.

Reduced agricultural yields will likely affect food security in the Mediterranean region.

From: Enterra Solutions, 2015, Food Security: A Growing Global Concern?. http://www.enterrasolutions.com/. Accessed 04/11/2016

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

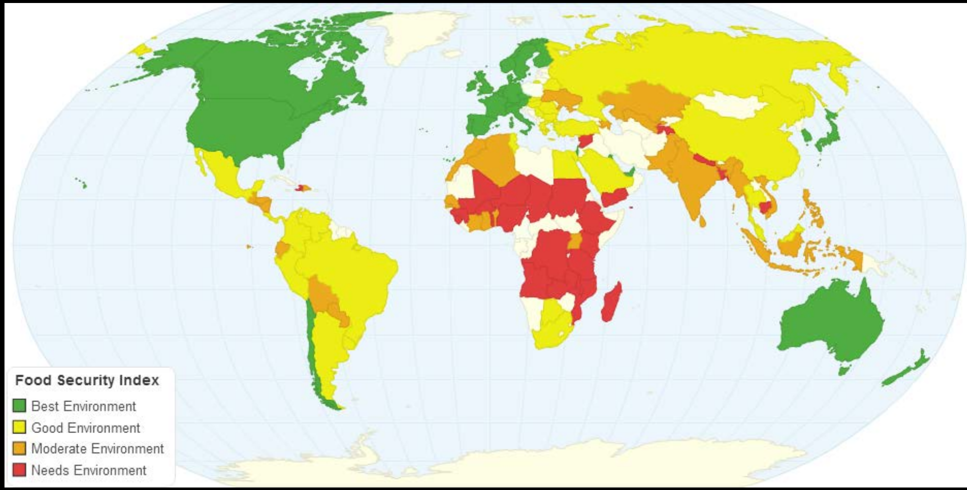
[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Consequences for Food Security

Surface run-off will fall significantly by 2050, and the risk of desertification will increase in all countries, in particular in the North Africa.

The IPCC (2007b) estimates that in North Africa due to climate change agricultural production will decline: for Algeria and Morocco a decrease in agricultural productivity of more than one third (Schilling et al. 2012).

Altogether climate change will diminish availability, accessibility, and utilization of food.



This chart shows the Global Food Security Index for the year 2015 (Global Food Security Index, 2015. http://foodsecurityindex.eiu.com/. Accessed 04/11/2016)

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Consequences for Food Security

Self-sufficiency in food will decline by mid-century, increasing the need in food imports (Alexandratos 1995, 2003).

In consequence, food prices may rise further as will be financial resources needed to pay for these imports.

All MENA countries will need to spend more for importing cereals.

These factors together "may trigger regional food crises, encouraging or exacerbating destabilization, the collapse of social systems, and violent conflicts" (Bruinsma 2003).

From: Global Food Crisis, 2014, Syria Suffers from Drought Causing Fear of Food Crisis. http://foodcrisisisglobal.blogspot.it. Accessed 24/09/2016

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

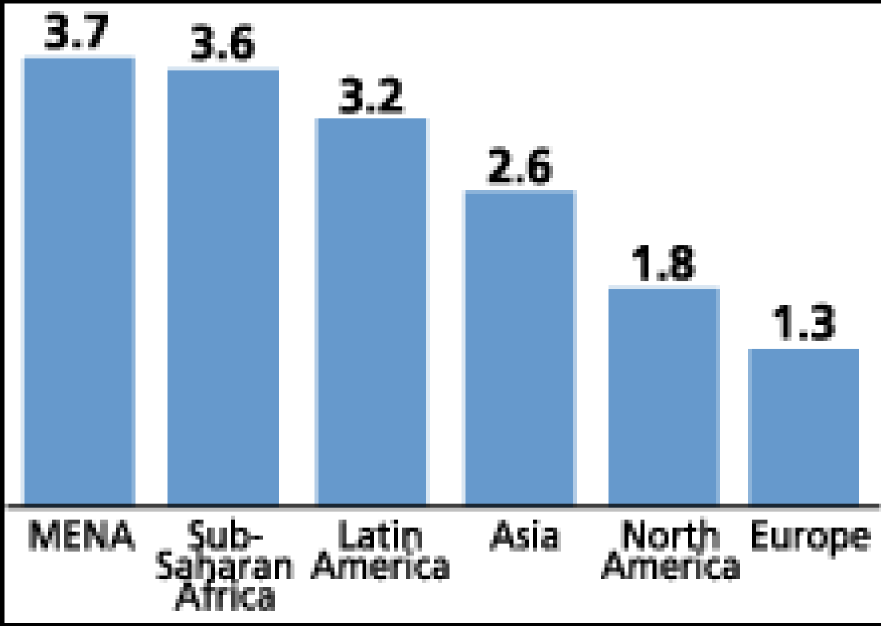
Population and Migration in the Mediterranean

Population and Demographic Trends in North Africa

The strong population growth and urbanization is increasing the demand for water and food on the national and regional scale.

From 1950 to 2010, the population of 11 MENA countries grew from 72,512,000 to 280,411,000 (fourfold in 60 years; UNDP 2011) and is projected to grow by an additional 111,169,000 people from 2010 to 2050, reaching about 370,352,000 people by 2100, based on the medium projection of the UN Population Division of May 2011.

The population is increasingly concentrated in large cities and along the coast.



Ratio of Population Size in 2000 to Population Size in 1950, by Major World Regions (Population Reference Bureau, 2001, Population Trends and Challenges in the Middle East and North Africa. http://www.prb.org/. Accessed 04/11/2016)

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

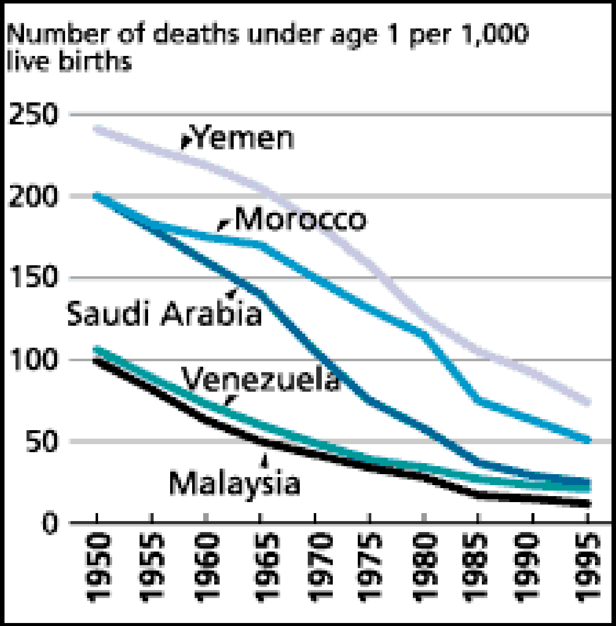
Population and Migration in the Mediterranean

Population and Demographic Trends in North Africa

The strong population growth and urbanization is increasing the demand for water and food on the national and regional scale.

From 1950 to 2010, the population of 11 MENA countries grew from 72,512,000 to 280,411,000 (fourfold in 60 years; UNDP 2011) and is projected to grow by an additional 111,169,000 people from 2010 to 2050, reaching about 370,352,000 people by 2100, based on the medium projection of the UN Population Division of May 2011.

The population is increasingly concentrated in large cities and along the coast.



Decline in Infant Mortality (Population Reference Bureau, 2001, Population Trends and Challenges in the Middle East and North Africa. http://www.prb.org/. Accessed 04/11/2016)

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

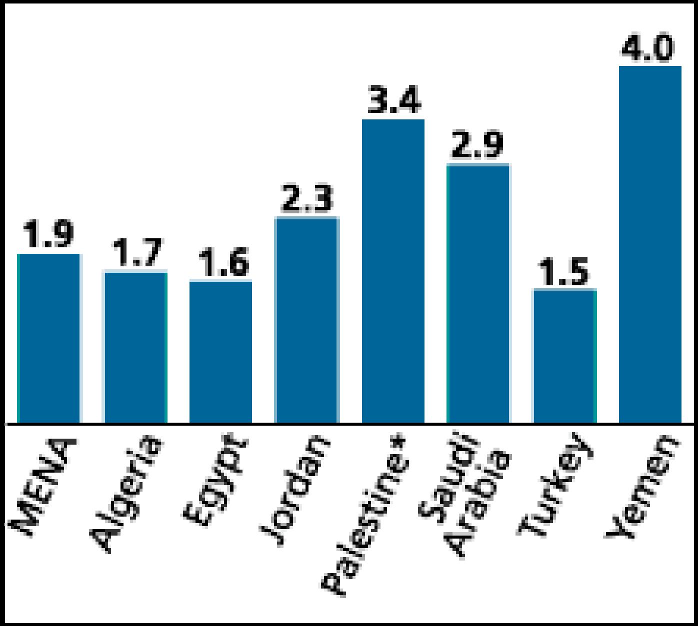
Population and Migration in the Mediterranean

Population and Demographic Trends in North Africa

The strong population growth and urbanization is increasing the demand for water and food on the national and regional scale.

From 1950 to 2010, the population of 11 MENA countries grew from 72,512,000 to 280,411,000 (fourfold in 60 years; UNDP 2011) and is projected to grow by an additional 111,169,000 people from 2010 to 2050, reaching about 370,352,000 people by 2100, based on the medium projection of the UN Population Division of May 2011.

The population is increasingly concentrated in large cities and along the coast.



Ratio of Projected Population Size in 2050 to Population Size in 2001 (Population Reference Bureau, 2001, Population Trends and Challenges in the Middle East and North Africa. http://www.prb.org/. Accessed 04/11/2016)

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Population and Migration in the Mediterranean

Population and Demographic Trends in North Africa

In North Africa nearly all projected population growth will be in cities that are projected to grow from 107.3 million people in 2010 to 223.3 million people in 2050 (UNDP 2010; Brauch 2012).

This rapid and often chaotic urbanization will result in mega cities (Brauch 2011) where the people are highly socially vulnerable. These population growth and urbanization trends pose different demands for water and food.

From: Green Africa Directory, 2014, C40 Report Shows Megacities Accelerating Climate Action. http://www.greenafricadirectory.org. Accessed 24/09/2016

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Population and Migration in the Mediterranean

<u>Population and Demographic Trends in North Africa</u>

Population in <u>coastal cities of the Mediterranean</u> region has grown between <u>1950 and 2000</u> from <u>25 to 70 million people</u> and it has been projected to rise up to <u>90 million</u> by <u>2025</u>.

Alexandria, one of the largest cities on the Mediterranean

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Population and Migration in the Mediterranean

Impact of Climate Change on Migration

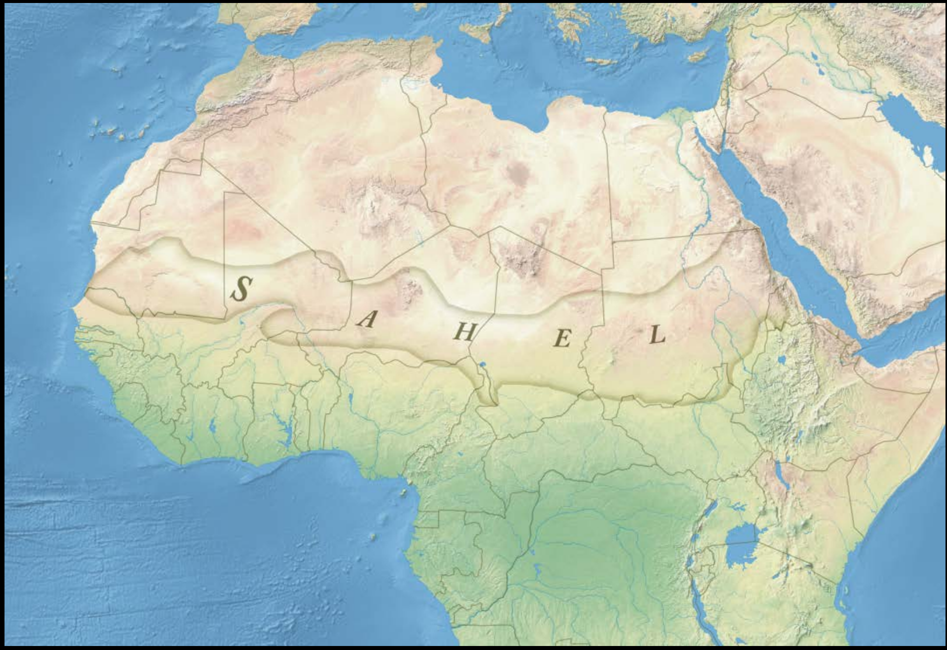
The discrepancies in income and development between Southern Europe and the MENA countries are a major driver for people to migrate across the Mediterranean Sea.

With a rising warming, it may be increasingly difficult to sustain the living standards and provide development opportunities for a growing population.

Lack of usable land and water resources adds to impoverishment and forces people to move from rural areas to cities, or to go abroad.

North Africa is both a destination and transit region for migrants.

Population pressures are amplified by migration from the Sahel region.



The Sahel region in Africa: a belt up to 1,000 km wide that spans the 5,400 km from the Atlantic Ocean to the Red Sea

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Population and Migration in the Mediterranean

<u>Impact of Climate Change on Migration</u>

Water scarcity and lower agricultural productivity may add to <u>migration pressure from the rural areas to urban centers</u> like Cairo and contribute to <u>degradation of sanitary conditions</u> and increasing social unrest as well.

Smog in Cairo

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

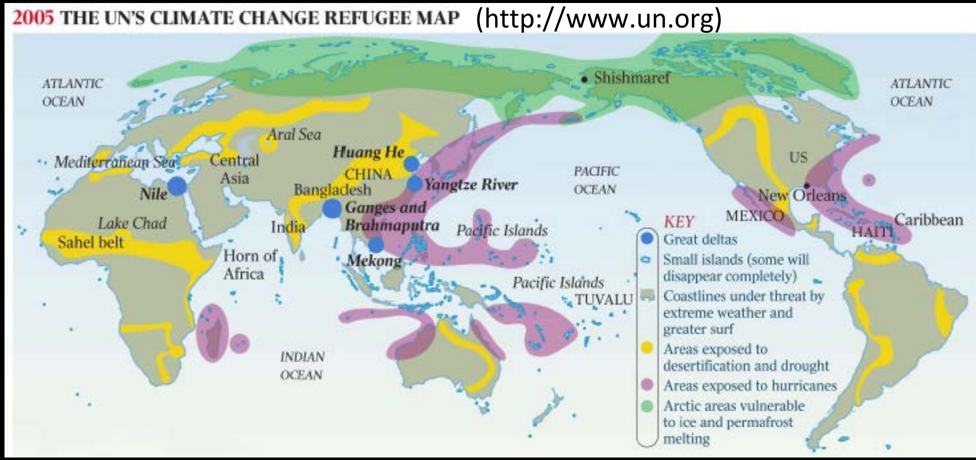
[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Population and Migration in the Mediterranean

Impact of Climate Change on Migration

According to WBGU (2008), “*the increase in drought, soil degradation and growing water scarcity in combination with high population growth, unstable institutions, poverty or a high level of dependency on agriculture means that there is a particularly significant risk of <u>environmental migration</u> occurring and increasing in scale*”.

In this view, migration of a large number of people could potentially increase the likelihood of <u>conflicts</u> in <u>transit</u> and <u>target regions</u> because <u>environmental migrants compete with the resident population for scarce resources</u> such as farmland, housing, water, employment, and basic social services; in certain cases they may upset the regional “ethnic balance” (Reuveny 2007).



A map showing where natural disasters caused/aggravated by global warming may occur, and thus <u>where environmental refugees would be created</u>

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Population and Migration in the Mediterranean

Impact of Climate Change on Migration

Estimating the number of climate-induced migrants is a controversial subject.

For some researchers, the number of "climate refugees" will dramatically rise, up to several hundred millions globally (Myers 2002).

These numbers have been questioned as speculative and exaggerated, lacking justification and empirical evidence (Jakobeit and Methmann 2012; Oels 2012).

Globally, regionally and in host countries there are no reliable international statistics on environmentally and climate-induced migration as environmental factors do not entitle the refugee status.

A comprehensive study (Black et al. 2011) shows that migration has to be considered as a multicausal and complex process that precludes isolating environmental factors from other migration drivers.

The pastoralist communities of Turkana, Kenya, are experiencing the longest period of drought in their history (Our World, 2011, Environmental Migrants: More than Numbers. https://ourworld.unu.edu. Accessed 25/09/2016)

Conflicts and Security Risks of Climate Change in the Mediterranean Region (I)

[Scheffran J., Brauch H. G., 2014. Conflicts and Security Risks of Climate Change in the Mediterranean Region. In: Goffredo S., Dubinsky Z. (eds) The Mediterranean Sea: Its history and present challeges. Springer, Dordrecht, p 625-640]

Population and Migration in the Mediterranean

Impact of Climate Change on Migration

In European policy debates migration has been described as an increasing security challenge.

In this view, both push and pull factors increase the migration pressure from some MENA countries to Europe, but also to the Arab Gulf, North America and even to Australia.

Accordingly, migration from the MENA region to the EU has become a major issue of domestic or internal security and of the intergovernmental policy coordination on justice and home affairs.

From: Vice News, 2015, The European Union Plans to Speed Up the Deportation of Illegal Migrants. https://news.vice.com. Accessed 25/09/2016